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ABSTRACT

This publication contains worker task lists and supplementary information for five occupations in the business cluster: (1) microcomputer network technology; (2) customer service representative; (3) computer network administrator; (4) computer information systems; and (5) business manager. The task lists were generated through the DACUM (Developing a Curriculum) process and/or by analysis by a panel of experts. The following supplementary information is included for each occupation: (1) microcomputer network technology--attitudes, knowledge, basic skills/techniques; (2) customer service--attitudes, knowledge, certification/professional associations, recommendations for students, general and technical skills, equipment/software, trends, competencies, career opportunities; (3) network administrator--attitudes, knowledge, certification/professional associations, general and technical skills, equipment/software/literature, trends, competencies; (4) information systems--traits and attitudes, trends, what workers need to know, recommendations for students, skills; and (5) business manager--attitudes, knowledge, certification/professional associations, general and technical skills, equipment/software, trends, core competencies, career ladder. (KC)

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OCCUPATIONAL ANALYSES

BUSINESS CLUSTER

Worker Task Lists and Supplementary Information
for Selected Occupations

ED 406 535

MICROCOMPUTER NETWORK TECHNOLOGY . . . . . .

CUSTOMER SERVICE REPRESENTATIVE . . . . . .

COMPUTER NETWORK ADMINISTRATOR . . . . . .

COMPUTER INFORMATION SYSTEMS . . . . . .

BUSINESS MANAGER . . . . . .

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Occupational Analyses
Business Cluster

Worker Task Lists and Supplementary Information for Selected Occupations

Developed by

Lord Fairfax Community College
Tidewater Tech Prep
Mountain Empire Tech Prep
Dabney S. Lancaster Community College

Produced by

Virginia Vocational Curriculum and Resource Center
2200 Mountain Road
Glen Allen, Virginia 23060

for

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Richmond, Virginia 23219

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INTRODUCTION

Employers in today's high-tech workplace need workers with a variety of qualifications. To be successful in most technical fields, workers must

- master a number of specific tasks
- understand and be able to use related technical concepts and theories
- exhibit traits and attitudes that employers find desirable.

Students who wish to enter technical career fields must have instruction that enables them to gain these qualifications. This instruction may be provided in several ways, including secondary vocational programs and community college technical degree or certificate programs.

The first step in designing a technical curriculum is to analyze one or more occupations to determine

- the tasks and activities performed by competent workers on the job
- the skills and knowledge workers need to perform these tasks
- the general skills, knowledge, traits, and attitudes necessary for employment success.

Instruction that reflects this information will help students compete for jobs in their chosen field.

Tech prep projects throughout Virginia have based their programs on occupational analysis. The method depends on local needs and circumstances, but at a minimum each results in lists of tasks and technical and employability skills. Methods include

- **DACUM (Developing A CurriculUM):** A panel of workers describes a single occupation (e.g., police officer) by writing tasks on cards and placing them on the wall. Adding, revising, rearranging, or discarding cards results in a picture of an occupation. A modified DACUM uses prepared cards which are edited by the panel.
- **Panel of Experts:** Experts in an occupational field (e.g., criminal justice) validate an existing task list and discuss "big picture" issues. Experts may be workers, manager, human resource specialists, or other industry representatives capable of predicting trends in employment, designing career paths, and determining standards of worker performance.

Although occupational analysis is primarily a local effort, tech prep project sites can validate lists generated in a different part of the state to begin their curriculum development process. Both secondary and postsecondary program designers and teachers can use occupational task lists and other employer information to update existing instruction, validate course content, and generate workplace applications in academic classes.

The collection of occupational analyses included in this guide are a part of the Business cluster of occupations. Career clusters are the organizational basis for tech prep, as students begin early to explore a group of similar occupations, narrowing choices along the educational path until they are highly qualified for a career specialty. For example, a student may begin by exploring hospitality occupations, decide to concentrate on food service, and pursue a career in dietetics.

Further information about the task lists published in this guide is available from the project directors:

"Microcomputer Network Technology"
Lord Fairfax Community College

"Customer Service Representative" and "Computer Network Administrator"
Tidewater Tech Prep

"Computer Information Systems"
Mountain Empire Tech Prep

"Business Manager"
Dabney S. Lancaster Community College

For additional information related to tech prep, please call Darlene Blake, Tech Prep Coordinator, Virginia Community College System, at (804) 371-6582. To request curriculum development resources or assistance from the VVCRC, please call (804) 261-5075 or send e-mail to vvcrc@pen.k12.va.us.

MICROCOMPUTER NETWORK TECHNOLOGY

Worker Task List 5
Attitude 7
Knowledge 7
Basic Skills/Techniques 7

WORKER TASK LIST

A. RESEARCHING HARDWARE AND SOFTWARE NEEDS
1. Survey needs of users.
2. Develop budget.
3. Conduct inventory of available resources.
4. Assess utilization of available resources.
5. Comply with/establish standards when purchasing.
6. Determine present and future maintenance needs.
7. Test drive a variety of equipment.
8. Assure compatibility of equipment.
9. Upgrade hardware and software.
10. Plan disaster recovery.
11. Establish anti-virus program.

B. PLANNING/EXPANDING LAN
1. Specify goals of LAN.
2. Assess resources.
3. Determine topologies of LAN.
4. Draft topology plans.
5. Integrate to multiple protocol.
6. Accommodate expansion of network.

C. ACQUIRING HARDWARE AND SOFTWARE
1. Comply with state and/or company regulations for data processes.
2. Implement company or organizational purchasing policies.
3. Determine specifications.
4. Prepare purchase requisitions.
5. Purchase and update equipment.
6. Verify order.
7. Authorize payment.

D. PROVIDING CUSTOMER SERVICE
1. Assess training needs.
2. Provide orientation to network systems.
3. Develop and implement a training plan.
4. Provide training to users.
5. Assess user satisfaction.
6. Provide/update user manual.
7. Use interpersonal skills.
8. Track hardware and software usage and problems.
9. Assess effectiveness of LAN for company goals.
10. Perform ergonomic study.
11. Identify repetitive stress syndromes.

E. MAINTAINING COMPUTER NETWORK
1. Maintain ongoing security/need for firewall.
2. Clean and maintain hardware.

3. Troubleshoot software and hardware problems.
4. Demonstrate upgrades/fixes.
5. Monitor usage and parameters.
6. Allocate LAN resources.
7. Maintain ongoing maintenance contracts.

F. INSTALLING/TESTING COMPUTER NETWORK
1. Determine need for subcontractors.
2. Contract with subcontractors.
3. Set up hardware.
4. Install software/NOS applications.
5. Wire a variety of topologies.
6. Document installation of cabling.
7. Set up work stations.
8. Implement security.
9. Solve server issues.
10. Evaluate environmental requirements.

G. PERFORMING COMMUNICATION FUNCTIONS
1. Compose business letters.
2. Use specified etiquette.
3. Present information orally.
4. Write notes from meetings.
5. Make a non-technical presentation.
6. Create a sequence of operation.
7. Write product/service specifications.
8. Ask clear, concise questions.
9. Give clear, concise directions.
10. Write a technical report.
11. Make a technical presentation.
12. Debate alternative solutions.
13. Write a non-technical report.
14. Interpret and follow instructions.
15. Compose a memo/fax/e-mail.
16. Review company correspondence.
17. Use listening skills.
18. Develop a contract.
19. Manage work requests.
20. Compose business letters.
21. Interpret product/service specifications.
22. Use telephone communications.
23. Distinguish between formal and informal writing situations.
24. Interpret technical literature.
25. Write a news release.
26. Research new developments.
27. Conduct research (library, internet, survey, etc.)
28. Adjust self to audience.

H. MATH/SCIENCE APPLICATIONS
1. Perform basic addition, subtraction, multiplication, and division functions.
2. Calculate percentages.

3. Convert units of measurements.
4. Estimate costs.
5. Analyze machinery and computers.
6. Use deductive and inductive reasoning.
7. Perform basic geometric functions.
8. Prepare and implement a budget.

I. WORKING ETHICALLY AND LEGALLY
1. Maintain proper licensing.
2. Comply with building codes.
3. Comply with copyright laws.
4. Employ confidentiality.
5. Identify user rights and policies.

J. ACHIEVING REMOTE ACCESS
1. Assess telecommunications products/services.
2. Install remote hardware/software.
3. Establish homework access.
4. Secure remote access.

SUPPLEMENTARY INFORMATION

ATTITUDE

Flexibility
Desire to be lifelong learner (self-directed learner)
Ability to be self-manager
Safety awareness traits
Team player traits
Realistic thinking skills
Ability to see "big picture"
Perseverance
Initiative
Risk-taking traits

KNOWLEDGE

Low voltage electronics
DOS/Windows
Rudimentary computer programming
Principles of technology
Word processing and other software applications
Connectivity
Personal liability
Basic safe operating procedures
Multi-media/CD ROM
Telecommunications
Binary codes
Logic

BASIC SKILLS/TECHNIQUES

Problem solving
Negotiation skills
Interpersonal skills
Decision-making skills
Time management skills
Mechanical skills
Ability to work with frustrated people
Diffusion skills

CUSTOMER SERVICE REPRESENTATIVE

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Equipment/Software 13
Trends in the Industry 13
Communications and Math Competencies 14
Career Opportunities 14

WORKER TASK LIST

A. COMMUNICATING WITH THE PUBLIC
1. Greet customer, identifying agency/business, and self.
2. Identify the customer.
3. Identify the purpose of the call.
4. Create positive image of agency/business.
5. Practice telephone courtesy.
6. Listen actively to the caller.
7. Ask probing questions.
8. Respond to the caller's request.
9. Manage the call (e.g., with talkative, angry, or impatient customer).
10. Accommodate individuals with special circumstances (internationl, hearing impairment, speech impairment, etc.).
11. Personalize the call (using specific details, addressing by surname).
12. Determine whether the issue has been resolved.
13. Confirm the action.
14. Conclude the conversation (expressing thanks, re-identifying the business, etc.).

B. DISSEMINATING INFORMATION
1. Provide information to the customer (internal and external).
2. Explain information to the customer (avoiding industry jargon).
3. Record accurate information from the customer.
4. Identify options available for solving the problem.
5. Calculate and interpret fees, prices, exchange rates, and other financial transactions.
6. Explain credit/billing procedures.
7. Initiate the mailing of various forms.
8. Initiate internal action.
9. Translate features into benefits (cross-selling).
10. Suggest complementary product/services.

C. MAKING ETHICAL BUSINESS DECISIONS
1. Adhere to policies designed to minimize losses due to error, theft, or fraud.
2. Maintain confidentiality of records (internal and external), and business policies.
3. Maintain honest relationship with customers (internal and external).
4. Follow through on promises (i.e., establish trust).
5. Adhere to policies regarding appropriate use of systems.
6. Take responsibilities for your actions.
7. Follow chain of command for problem solving.

D. OPERATING AS A TEAM MEMBER
1. Follow instructions from supervisor.
2. Share knowledge and techniques (including both successes and failures) with co-workers.
3. Participate in peer monitoring.
4. Provide support for co-workers (e.g., share strengths, take initiative).
5. Maintain good work habits (including those related to attendance, breaks, personal calls, punctuality).

6. Deal constructively with conflict (e.g., regarding scheduling, interpersonal/intergroup relationships).
7. Respond positively to constructive criticism.
8. Utilize all available resources.
9. Pull one's fair share of the workload.

E. IMPROVING THE EFFECTIVENESS OF CUSTOMER SERVICES
1. Prepare/conduct customer response survey.
2. Monitor/record/analyze quality and productivity data.
3. Conduct cost studies of service operations and activities.
4. Recommend changes based on data analysis.
5. Prepare/implement plans for long- and short-range objectives.
6. Implement changes in policies and procedures.
7. Write scripts for various situations/issues.
8. Collect customer information for use in improving products and services.

F. COMPLYING WITH COMPANY AND GOVERNMENT REGULATIONS
1. Adhere to policies for ensuring compliance with regulations.
2. Access necessary information to comply with various rules and regulations affecting business.
3. Demonstrate compliance with company and government regulations.

G. DEVELOPING HUMAN RESOURCES
1. Interview prospective employees.
2. Develop/implement personnel policies for employees.
3. Develop/implement a training program for employees.
4. Develop/implement employee evaluation system.
5. Develop/implement employee development program.
6. Participate in ongoing department and cross-training opportunities.

H. PERFORMING WORK STATION FUNCTIONS
1. Sign on/off with employee identification code/procedures.
2. Handle phone system transactions (e.g., holds, transfers, conference calls, etc.).
3. Maintain security of user identifications and codes.
4. Search systems for information.
5. Retrieve/enter/transfer information on systems.
6. Adjust work station ergonomically.
7. Maintain office equipment.

SUPPLEMENTARY INFORMATION

ATTITUDES

- Empathy
- Versatility
- Resourcefulness
- Attention to detail
- Energy and enthusiasm
- Patience
- Flexibility
- Tenacity
- Team-player traits
- Sense of humor
- Ability to be issue-focused, rather than person-focused
- Ability to see from customer's perspective
- Positive self-image
- Appropriate dress
- Loyalty to company

KNOWLEDGE

- English grammar
- English composition
- Foreign language (especially Spanish)
- Human relations
- Psychology
- Basic mathematics
- Sociology

CERTIFICATION/PROFESSIONAL ASSOCIATIONS

No specific certification or professional associations named

RECOMMENDATION TO STUDENTS

Panel recommended that students participate in co-curricular student organizations.
Panel recommended that students choose a company with good benefits.

GENERAL AND TECHNICAL SKILLS

- Career development
- Keyboarding
- Stress management
- Writing skills
- Organizational skills
- Time management skills
- Oral communication skills
- Oral reading skills
- Reading comprehension

EQUIPMENT/SOFTWARE

- Computer
- Copy machine
- Fax machine
- 10-key calculator
- TDD
- Coffee machine

TRENDS IN THE INDUSTRY

- Re-engineering/downsizing
- Changing technology
- Lifelong learning
- Career awareness and exploration
- Awareness of cultural diversity
- Need to enhance one's value to company
- Project management/teamwork

COMMUNICATIONS AND MATH COMPETENCIES

Performing Communications Functions

- Present information orally and in writing, with clarity and grammatical accuracy.
- Log telephone transactions.
- Practice telephone courtesy.
- Practice listening skills.
- Interview clients.
- Ask clear/concise questions.
- Compose memos.
- Compose letters.
- Write reports.
- Complete forms and documents.
- Write/edit customer orders.
- Write notes from meetings.
- Proofread own work and others'.
- Interpret written customer requests.
- Interpret and follow directions.
- Interpret product/service specifications.
- Interpret technical literature.
- Make oral presentations to an audience.
- Read and respond to e-mail.

Applying Math Concepts

- Perform basic math calculations.
- Convert foreign currency.
- Calculate percentages.
- Construct and interpret graphs/data tables.
- Calculate averages.
- Interpret/calculate statistics.
- Verify overall assembly dimensions.
- Calculate interest.

CAREER OPPORTUNITIES

Entry-Level Positions (with high school diploma or GED and relevant coursework/co-op experience)

- Customer Services Representative (seasonal; part-time; full-time)
- Sales Agent (telephone)
- Teller

Advanced-Level Positions (with relevant community college coursework and/or experience)

- Senior Customer Services Representative
- Group Leader/Assistant Supervisor
- Customer Service Supervisor
- Project Leader/Manager

Panel's Comments on a Career in Customer Services

Advancement to top-level positions in customer service is based mostly on performance and experience.

Employment in this field tends to reflect the following characteristics:

- Seasonal work
- Repetitive tasks
- Sedentary working conditions
- Low opportunity for advancement
- Schedules based on a 24-hour day, with most active time from 11 a.m. - 2 p.m. EST
- Employees expected to be available 7 days a week

COMPUTER NETWORK ADMINISTRATOR

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General and Technical Skills 19
Equipment/Software/Literature 20
Trends in the Industry 20
Communication and Math Competencies 20
Career Opportunities 20

WORKER TASK LIST

A. RESEARCHING HARDWARE AND SOFTWARE NEEDS
1. Survey needs of users (including remote access users).
2. Inventory current resources.
3. Assess utilization of current resources.
4. Evaluate available technology.
5. Determine existing licensing rights.
6. Determine present and future maintenance needs.
7. Evaluate uptime requirements.

B. PLANNING/EXPANDING NETWORK
1. Present research findings.
2. Develop goals of network.
3. Accommodate expansion of network.
4. Demonstrate product and cost alternatives (including disaster recovery).
5. Evaluate feedback.
6. Determine/revise applications.
7. Determine/revise work station operating system.
8. Determine/revise network operating system.
9. Determine topologies of network.
10. Establish hardware upgrade plan.
11. Establish/revise company standards for hardware and software.
12. Select hardware/software for purchase.
13. Determine necessary licensing.
14. Determine need for subcontractors.
15. Develop budget.
16. Evaluate environmental requirements (cabling, wiring closets, air-conditioning, etc.).

C. ACQUIRING HARDWARE AND SOFTWARE
1. Implement company or organization purchasing policies.
2. Comply with purchasing standards and procedures.
3. Write bid specifications/justifications.
4. Prepare purchase requisitions.
5. Purchase equipment/software.
6. Verify order.
7. Authorize payment.

D. INSTALLING/TESTING COMPUTER NETWORK
1. Contract with subcontractors.
2. Build wiring centers.
3. Build cool rooms.
4. Wire facilities.
5. Test wiring.
6. Install routers and hubs.
7. Build servers (including installation of NOS, backup, UPS, etc.).
8. Set up work stations (network card, work station software, user software, optimization of memory, etc.).

9. Test for hardware conflicts (memory, I/O, software, etc.).
10. Install application software.
11. Implement user accounts and user access.
12. Test backup and recovery.
13. Test user accessibility.
14. Test application installations.

E. PERFORMING DOCUMENTATION FUNCTIONS
1. Document file server setup.
2. Document wiring installation.
3. Document software/hardware standards.
4. Document print servers, print queues, and printers.
5. Print configuration files.
6. Document directory services schema.
7. Print log-in scripts.
8. Document remote communications (including numbers to modem lines).
9. Inventory work stations and associated cable runs.
10. Document licensing agreements.
11. Document disaster recovery plan.
12. Compile warranties.

F. MANAGING SECURITY AND INTEGRITY
1. Implement disaster recovery procedures.
2. Evaluate backup procedures.
3. Develop access matrices.
4. Develop audit procedures (e.g., Windows NT, UNIX).
5. Design/implement physical security of file server and work stations.
6. Restrict unauthorized access.
7. Establish/implement anti-virus procedures.

G. PERFORMING LEGAL AND ETHICAL FUNCTIONS
1. Assure proper licensing.
2. Comply with copyright laws.
3. Implement user security policies.

H. MAINTAINING COMPUTER NETWORK
1. Assure ongoing security (e.g., need for firewall).
2. Clean and maintain hardware.
3. Trouble-shoot software and hardware problems.
4. Monitor usage.
5. Allocate network resources (e.g., new users, reorganized departments, news groups).
6. Maintain ongoing maintenance contracts, as needed.
7. Maintain awareness of current technologies.
8. Evaluate/recommend upgrades, fixes, modifications, new equipment/software as needed.
9. Test disaster recovery procedures.
10. Order supplies as needed (toner cartridges, diskettes, back-up tapes, etc.).
11. Perform periodic work station audits for copyright compliance.

I. PROVIDING USER TRAINING AND SUPPORT

1. Assess training needs.
2. Provide orientation to network system.
3. Develop/implement training plan.
4. Provide training to users.
5. Provide/update user manual.
6. Evaluate training effectiveness.
7. Provide ongoing user support.
8. Evaluate user feedback.
9. Track hardware and software usage and problems.
10. Coordinate external support.
11. Train assistant/backup network administrator.

SUPPLEMENTARY INFORMATION

ATTITUDES

- Sense of self direction
- Willingness to be a lifelong learner
- Ability to work comfortably with others
- Patience
- Willingness to follow office protocol
- Diplomacy
- Flexibility regarding scheduling
- Strong sense of standards

KNOWLEDGE

- OSI reference model
- BASIC or PASCAL (one semester)
- DOS (detailed)/Memory management
- WINDOWS
- General principles of DOS and networking protocols
- Hardware building/configuration
- Basic cabling/wiring
- General office skills
- Basic word processing
- Basic spreadsheet
- Basic database management
- Basic e-mail package
- Basic graphics package
- Principles of firewalls and other network security

CERTIFICATION/PROFESSIONAL ASSOCIATIONS

- Microsoft Certified System Engineer
- Novell Certified Netware Engineer/ Master/Administrator
- Netware Users International
- Professional Netware Association of Hampton Roads
- Netware Professionals Association
- Data Processing Management Association

GENERAL AND TECHNICAL SKILLS

- Stress management skills
- Organizational skills
- Problem-solving skills
- Time-management skills
- Excellent oral/written communication skills
- Keyboarding skills
- Skill in using online services (useful for getting troubleshooting information)
- Research skills

EQUIPMENT/SOFTWARE/LITERATURE

- Calculator
- Personal computers
- Telephone system
- Fax machine
- Printers
- Copying machines
- Industry journals and newspapers

TRENDS IN THE INDUSTRY

- Users more computer literate
- Movement toward wireless communication devices
- Movement toward directory services
- Constant change

COMMUNICATION AND MATH COMPETENCIES

Performing Communication Functions

- Write notes from meetings.
- Log telephone transactions.
- Compose memos/e-mail.
- Perform telephone communications.
- Write product/service specifications.
- Use listening skills.
- Interpret and follow directions/instructions.
- Practice specified etiquette.
- Present information orally.
- Prepare for an interview.
- Ask clear, simple, probing questions.
- Give clear, concise directions.
- Create a sequence of operation.
- Debate alternative solutions.
- Make nontechnical presentations.
- Interpret technical literature.
- Interpret contracts, licenses, and warranties.
- Prepare written/oral justification of hardware/software packages.
- Interpret product/service specifications.
- Distinguish between formal and informal writing situations.
- Write business letters.
- Write nontechnical reports.
- Write technical reports.
- Make technical presentations.
- Conduct research (library, Internet, surveys, etc.).
- Negotiate contracts and other agreements.
- Review company correspondence.
- Manage priority/work requests.

Applying Math Concepts

- Perform basic math calculations.
- Convert units of measurement (e.g., decimal to hexadecimal).
- Calculate percentages.
- Construct and interpret graphs/data tables.
- Determine/verify overall assembly dimensions.
- Estimate material quantities.
- Estimate costs.
- Prepare a budget.
- Calculate statistics.
- Analyze machinery/computers.
- Analyze/set tolerances.
- Calculate IP address.
- Calculate BTU's and thermal dispersion.
- Calculate power requirements.
- Estimate load-bearing and weight requirements.

Career Opportunities

Entry-Level Positions (with high school diploma and relevant high school coursework/co-op experience)

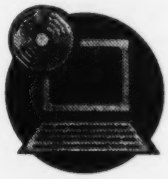
- Computer electronics technician (a few jobs at this level)
- Microcomputer specialist (a few jobs at this level)
- Community college co-op program (best option, according to panel)

Advanced-Level Positions (with relevant community college diploma/degree)
Network engineer
Network administrator

Top-Level Positions (with further education/experience leading to certification)*
Managerial positions

* The panel noted that although a bachelor's degree is not necessarily required at this level, it is an advantage. In general, holders of the four-year degree are perceived to be better rounded, to have a stronger sense of responsibility, and to have better management skills than candidates without the degree.

Computer Information Systems



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Future Trends 27
Educated User Needs to Know 27
Recommendations 27
Skills 27

WORKER TASK LIST

A. PERFORMING MANAGEMENT FUNCTIONS
1. Keep up-to-date with computer systems hardware and software according to company needs.
2. Keep up-to-date with programming languages and techniques.
3. Provide technical assistance to company personnel.
4. Participate on project team.
5. Assist with development or modification of internal policies and procedures.
6. Implement internal policies and procedures.
7. Assist in customizing specialized internal software.
8. Report informally on project development.
9. Recommend the purchase, lease, or rental of hardware or software.
10. Assist in managing software licensure.

B. COMMUNICATING WITH OTHERS
1. Clarify user request.
2. Determine method of data input.
3. Design input and output format or media.
4. Develop user documentation for a requested project.
5. Develop technical documentation for requested project.
6. Contribute to development of training manuals.
7. Assist with user training.
8. Communicate with vendor and user representatives about hardware or software problems.

C. IMPLEMENTING AND MAINTAINING THE SYSTEM/APPLICATION
1. Coordinate parallel testing of system/application.
2. Implement system/application from test environment to production environment.
3. Evaluate system following implementation.
4. Identify and evaluate proposed system/application modification.
5. Apply modifications (revisions) to application.
6. Test and implement system/application modification.
7. Document application modifications.
8. Trouble-shoot.

D. CONFIGURING SOFTWARE SYSTEMS
1. Maintain usability and integrity of computer software.
2. Evaluate new systems sotware products.
3. Obtain and implement software releases.
4. Provide and obtain consultation services.
5. Prepare and maintain system procedures backup files.
6. Develop, maintain, and monitor software and data security.
7. Communicate with vendor representatives about hardware or software problems.
8. Assist in determining equipment configuration.
9. Design file or database structure.
10. Participate in staff review of database or file structure.

11. Develop detailed program specifications.
12. Determine the scope of the system.
13. Evaluate program performance.

E. IMPLEMENTING AND MAINTAINING NETWORK
1. Evaluate needs for network.
2. Design network environment.
3. Investigate sources of networks.
4. Recommend network hardware and operating system.
5. Install the network.
6. Test the network.
7. Trouble-shoot the network.
8. Document the network.
9. Train network users.
10. Administer the network.
11. Develop/Implement backup procedures.
12. Develop/Implement records management procedures.

F. MAINTAINING HARDWARE
1. Trouble-shoot hardware.
2. Upgrade hardware.
3. Clean hardware.
4. Maintain cabling, routers, MAU's, and gateways.

SUPPLEMENTARY INFORMATION

TRAITS AND ATTITUDES FOR SUCCESS

Orientation to quality
Good listening skills
Self motivation
Good work ethics
Ambition
Logical thinking skills
Desire for challenge
Problem-solving skills
Patience
Honesty
Willingness to learn
Willingness to change
Ability to accept criticism
Abillity to work with population
Team-player traits
Communication skills
Dependability
Imagination
Innovation in finding solutions to recurring problems
Ability to be a risk taker
Self-confidence
Ability to accept responsibility
Ability to follow directions
Ability to follow through
Loyalty
Winning attitude
Tactfulness
Accountability
Fact-finding determination
Professional demeanor/behavior/appearance
Orientation/accuracy for detail

FUTURE TRENDS

- Multimedia
- Information superhighway
- Work station design
- Emphasis on security
- Digitized media
- Home use
- Smart houses
- Outsourcing - corporation services
- Telecommuting
- Interactive networking
- PEN-based computing

EDUCATED USER NEEDS TO KNOW

- Operating system basics
- Commands/Terminology
- Type or Keyboard
- Software being used

RECOMMENDATIONS

- Know employment process (sell yourself).
- Participate in internships.
- Emphasize quality of student achievement.
- Use compatible skills gained through experience.

SKILLS

Reasoning and Problem Solving

- Identify problems.
- Evaluate alternative solutions, weighing risks and benefits.
- Formulate decisions logically.
- Separate fact from opinion and inference.
- Adjust to unanticipated situations by applying established rules and facts.
- Devise new ways of handling recurring problems.
- Determine what is needed to accomplish work assignment.
- Apply the scientific process.
- Diagnose malfunctions.

Speaking and Listening

- Communicate in standard English.
- Establish the intent and details of oral communications.
- Give clear, concise instructions.
- Summarize principal and subsidiary ideas in discussions.
- Obtain, clarify, and verify information through questioning.
- Participate in discussions to achieve resolutions.
- Make presentations.

Principles of Teamwork

- Interact socially in a manner conducive to rapport.
- Demonstrate respect for the opinions, customs, and individual differences of others.
- Offer and accept criticism constructively.
- Handle conflict in a mature manner.
- Participate as a team member in work toward a common goal.
- Participate as team leader.

Personal Work Habits

- Exhibit a realistic, positive attitude toward self.
- Exhibit a positive attitude and pride toward work.
- Exhibit willingness to learn.
- Exhibit self-discipline and dependability.
- Exhibit regular and punctual attendance.
- Set goals and allocate time to achieve them.
- Accept responsibility.
- Work with or without supervision.
- Exhibit appropriate dress, grooming, and hygiene.
- Work within an organization's rules, policies, and procedures.
- *Apply time management.
- *Exhibit ethics.

Reading

- Assimilate the content of technical documents and memos.
- Note details and facts.
- Distinguish between and summarize principal and subsidiary ideas.
- Identify inconsistency in written material.
- Verify information.
- Evaluate the worth and objectivity of sources.
- Interpret quantitative information in tables, charts, and graphs.

Computation

- Add, subtract, multiply, and divide whole numbers, decimals, and fractions.
- Calculate distance, weight, area, volume, and time.
- Convert from one measurement system to another.
- Determine the costs, time, or resources necessary for a task.
- Apply principles of simple probability and statistics.
- Calculate, using information obtained from charts, graphs, and tables.
- Use ratios, proportions, percentages, and algebraic equations with a single unknown.
- Estimate results and judge their accuracy.

Business Principles

- Understand the political, economic, and social systems of the U. S. and other countries.
- Understand the roles of money, capital investment, product pricing, cost, profit, and productivity.
- Determine the differences among economic principles, facts, and value judgments.
- Determine the forms and functions of local, state, and federal governments.
- Assess supply and demand in a free market system.

Science and Technology

- Demonstrate ability to prepare detailed logic flow for program.
- Demonstrate knowledge of multimedia.
- Demonstrate knowledge of PC technology.

* Skills suggested by panel members to be included in survey.

BUSINESS MANAGER

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WORKER TASK LIST

A. MANAGING CLIENT/CUSTOMER SERVICE
1. Assist visitors and callers (customers, vendors, suppliers, etc.).
2. Conduct market research.
3. Demonstrate benefits and features of product or service.
4. Establish advertising, promotion, or public relations activities.
5. Evaluate credit applications.
6. Disseminate information or instructions.
7. Support community service activities.
8. Resolve concerns or complaints.
9. Determine customer wants and needs.
10. Arrange for collection and payment.
11. Ensure quality of product or service.

B. MANAGING BUSINESS OPERATIONS
1. Select equipment and software.
2. Maintain supplies and forms.
3. Ensure a safe working environment.
4. Maintain company security.
5. Maintain flow of work and information.
6. Participate in setting business goals and objectives.
7. Evaluate work activities and projects.
8. Implement emergency procedures.
9. Recommend changes in operations.
10. Adjust operations according to financial conditions.

C. MANAGING INFORMATION
1. Gather information.
2. Store and retrieve information.
3. Report activities, decisions, and events.
4. Issue and follow directions.
5. Consider differing opinions or points of view.
6. Recommend a course of action.
7. Approve recommendations.
8. Explain decisions.
9. Establish contacts/networks for communication or assistance.
10. Keep abreast of new developments.
11. Facilitate meetings/conferences.
12. Present information in a group setting (internal and external groups).
13. Prepare audiovisual/written scripts.
14. Prepare written technical reports.

D. MANAGING HUMAN RESOURCES
1. Review employment applications.
2. Select applicants for employment.
3. Provide for employee orientation, training, and professional development.
4. Make work assignments and schedules.

5. Supervise worker performance.
6. Evaluate worker performance.
7. Maintain employee records.
8. Resolve interpersonal conflicts.
9. Acquire training to improve own performance.
10. Initiate activities to maintain employee morale.
11. Model professional appearance and behavior.
12. Monitor worker environment.
13. Ensure that workers have a knowledge of ethical behavior (e.g., confidentiality, conflict of interest, copyright/patent protection).
14. Ensure compliance with rules and regulations.
15. Establish company policies and procedures.
16. Allocate space.
17. Administer benefits.
18. Administer compensation.
19. Ensure compliance with governmental regulations (e.g., health, safety, environmental, employment practice).

E. MANAGING FINANCIAL MATTERS
1. Recommend budget allocations.
2. Recommend/approve expenditures.
3. Ensure that accounting functions are followed.
4. Recognize tax implications of financial decisions.
5. Maintain payroll records.
6. Supervise collections.
7. Prepare financial statements.
8. Forecast future earnings.

SUPPLEMENTARY INFORMATION

ATTITUDES

Initiative
Attention to personal hygiene and appearance
Tolerance
Acceptance of cultural and physical diversity
Leadership
Acceptance of change
Consistency and fairness
Team-player traits
Open communication lines
Firmness
Friendliness
Ability to control temper
Ability to operate under stress

KNOWLEDGE

- Accounting
- Communication (oral and written)
- Basic math
- TQM, ISO9000/9001, etc.
- Economics
- Psychology
- Technical writing
- Business English
- Office procedures
- Industrial/Business safety compliance
- Records management (including filing)
- Public speaking
- Business ethics
- Word Processing/Spreadsheet/Databases
- Automation/robotics
- Career exploration

CERTIFICATION/PROFESSIONAL ASSOCIATIONS

- OSHA
- Industry-specific licenses (insurance, welding, etc.)
- Industry-specific affiliations

GENERAL AND TECHNICAL SKILLS

- Computer literacy
- Time management
- Keyboarding skills
- Electronic communication skills (e-mail, etc.)
- Problem-solving skills
- Decision-making skills
- Listening skills
- Teamwork skills
- Organizational skills
- Telephone skills
- Interviewing skills

EQUIPMENT/SOFTWARE

- Calculator
- Ruler
- Computer (PC and CRT mainframe)
- Copier
- Fax
- Dictaphone
- Phone system
- Audiovisual equipment
- Software
  - Lotus 1,2,3
  - WordPerfect
  - Word
  - Excel
- DOS/Windows operating systems

TRENDS IN THE INDUSTRY

- Awareness of cultural diversity
- Importance of teamwork
- Rightsizing
- Less centralization
- Cross training
- Networking
- Satellite communication/telecommunications

CORE COMPETENCIES IN COMMUNICATION AND MATH

Performing Communication Functions

- Prepare letters (compose, edit/keyboard).
- Prepare written technical reports (compose/edit/keyboard).
- Prepare memos (compose/edit/keyboard).
- Prepare script for audiovisual presentation.
- Use correct grammar, punctuation, and spelling.
- Proofread written communications.
- Communicate concisely in both written and oral situations.
- Conduct research.
- Use appropriate technical and nontechnical vocabulary.
- Practice legible handwriting skills.
- Practice effective listening skills.
- Give and follow directions.
- Present information to a group.
- Facilitate meetings and conferences.
- Interview prospective employees.
- Practice telephone etiquette.
- Practice general office etiquette.
- Communicate orally with individual customers in confident, informed manner.

Applying Math Concepts

- Perform basic math calculations (including decimals, fractions, and percentages) manually and with calculator.
- Convert units of measurement.
- Determine measurements with ruler.
- Perform calculations and measurements using metric units.
- Set up equations from verbal problems.
- Construct and interpret graphs/data tables.
- Interpret statistics.
- Read blueprints.
- Produce drawings/technical designs.
- Balance a check book.
- Perform basic accounting skills.
- Interpret a financial statement (e.g., profit/loss statement).
- Perform cost conversions.

CAREER LADDER

High School Diploma

- Production worker
- Clerical worker
- Other industry-specific entry level position (e.g., appraiser, welder, spray painter, maintenance apprentice)

Community College Degree (in Business Management/Business Administration/Office Administration)

- Entry-level manager (assuming previous experience in industry)
- Entry-level office administrator (assuming previous experience in industry)

Baccalaureate Degree (in Business Administration)

- Advanced-level manager (assuming previous experience in industry)

In accordance with the requirements of the Office of Gender Equity for Career Development, Virginia Department of Education, the Carl Perkins Act, and other federal and state laws and regulations, this document has been reviewed to ensure that it does not reflect stereotypes based on sex, race, or national origin.

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